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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS  
AND INTERFERENCES**

Application Number: 10/616,716  
Filing Date: July 10, 2003  
Appellant(s): ADACHI ET AL.

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Christopher Rauch  
For Appellant

**EXAMINER'S ANSWER**

This is in response to the appeal brief filed 9/9/2009 appealing from the Office action mailed 12/28/2007.

**(1) Real Party in Interest**

A statement identifying by name the real party in interest is contained in the brief.

**(2) Related Appeals and Interferences**

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

**(3) Status of Claims**

The statement of the status of claims contained in the brief is correct.

**(4) Status of Amendments After Final**

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

**(5) Summary of Claimed Subject Matter**

The summary of claimed subject matter contained in the brief is correct.

**(6) Grounds of Rejection to be Reviewed on Appeal**

The appellant's statement of the grounds of rejection to be reviewed on appeal is correct.

**(7) Claims Appendix**

The copy of the appealed claims contained in the Appendix to the brief is correct.

**(8) Evidence Relied Upon**

US 6949312	Kawakami	09-2005
WO 01/22519	Fujita	03-2001

US 6884546	Fujita	04-2005
WO 00/33403	Iwamoto	06-2000
US 6824920	Iwamoto	11-2004

### **(9) Grounds of Rejection**

The following ground(s) of rejection are applicable to the appealed claims:

Claims 1-5, 7-11, 13-16, 18, 19 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6949312) in view of Fujita (WO 01/22519) (equivalent document US 6884546 relied upon for English translation) and Iwamoto (WO00/33403) (equivalent document US 6824920 relied upon for English translation).

Kawakami discloses a battery comprising a cathode, an anode, and an electrolyte. The negative and positive electrodes are capable of intercalating and de-intercalating lithium (applicant's light metal). The anode further contains graphite (applicant's claims 7, 8, and 9) (28:35). The anode further contains tin (applicant's claims 10 and 11) (27:58). The electrolyte contains  $\text{LiBF}_4$ , (applicant's claim 15) (29:21). The battery was made to be of an anode capacity-controlled type in that the cathode capacity was made to be larger than the anode capacity (applicant's claim 1) (29:52-55).

Kawakami does not disclose that the light metal is deposited on the anode at an open circuit voltage lower than overcharge voltage (instant claim 1). Iwamoto does not disclose a battery wherein a ratio A/B is at least 0.05 to at most 3, A being the capacity

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component obtained by deposition and dissolution of light metal and B being the capacity component obtained by insertion and extraction of light metal (instant claim 20). However, Fujita teaches a negative electrode containing negative electrode material capable of occluding/releasing lithium in an ionic state and thereby, lithium metal precipitates (applicant's deposition and dissolution) in the negative electrode in a state where the open circuit voltage is lower than the overcharge voltage. In other words, lithium is occluded in an ionic state in a negative electrode material capable of occluding/releasing lithium in the beginning of charging and then lithium metal precipitates on the surface of the negative electrode material thereafter during charging. The amount of precipitation of lithium metal is preferable to be from 0.05 to 3.0 times, both inclusive, the ability of charging capacity of the negative electrode material capable of occluding/releasing lithium. Thereby, high energy density and an excellent cycle characteristic can be obtained. See Abstract and 17:65-18:30, 19:37-45. Thus, it would have been obvious to one of ordinary skill in the art at the time the invention was made to modify Kawakami's battery with the teachings of Fujita for the benefit of improving the overall performance of the battery by depositing lithium after charging.

Kawakami modified by Fujita does not teach the electrolyte containing a light metal salt having a M-O bond (applicant's claims 1-3 and 5). Iwamoto teaches that the electrolyte contains bis(1,2-benzene diolate(2-)-O,O')lithium borate (applicant's claims 1-4). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kawakami's  $\text{LiBF}_4$  for Iwamoto's bis(1,2-benzene diolate(2-)-O,O')lithium borate because they are art recognized equivalents as ionic

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conductive compounds in a lithium battery electrolyte . See MPEP 2144.06. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Kawakami modified by Fujita does not teach the electrolyte containing  $\text{LiPF}_6$ ,  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ,  $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$ , and  $\text{LiClO}_4$  (applicant's claims 13 and 15-18). Iwamoto teaches an electrolyte containing  $\text{LiPF}_6$ ,  $\text{LiN}(\text{CF}_3\text{SO}_2)_2$ ,  $\text{LiN}(\text{C}_2\text{F}_5\text{SO}_2)_2$ ,  $\text{LiC}(\text{CF}_3\text{SO}_2)_3$ , and  $\text{LiClO}_4$  (9:50-55). It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kawakami's  $\text{LiBF}_4$ , for Iwamoto's lithium compounds because they are art recognized equivalents as ionic conductive compounds in a lithium battery electrolyte. See MPEP 2144.06. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. Sinclair & Carroll Co. v. Interchemical Corp., 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

Claim 12 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6949312) in view of Fujita (WO 01/22519) (equivalent document US 6884546 relied upon for English translation) and Iwamoto (WO00/33403) (equivalent document US 6824920 relied upon for English translation) as applied to claim 1, further in view of Morigaki (US 2002/0061448).

Kawakami modified by Fujita does not teach the electrolyte contains a polymeric

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compound. Morigaki teaches a lithium polymer battery in which a host polymer retains the liquid organic electrolyte (abstract). It would have been obvious to one of ordinary skill in the art at the time the invention was made to use a polymer electrolyte instead of a liquid electrolyte for the benefit of avoiding electrolyte leakage.

Claim 17 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kawakami (US 6949312) in view of Fujita (WO 01/22519) (equivalent document US 6884546 relied upon for English translation) and Iwamoto (WO00/33403) (equivalent document US 6824920 relied upon for English translation) as applied to claim 1, further in view of Yoshioka (US 2001/0005558).

Kawakami modified by Fujita does not teach an electrolyte containing  $\text{LiC}(\text{CF}_3\text{SO}_2)_3$ . Yoshioka teaches an electrolyte containing  $\text{LiC}(\text{CF}_3\text{SO}_2)_3$  [0054]. It would have been obvious to one of ordinary skill in the art at the time the invention was made to substitute Kawakami's  $\text{LiBF}_4$ , for Yoshioka's lithium compounds because they are art recognized equivalents as ionic conductive compounds in a lithium battery electrolyte. See MPEP 2144.06. It has been held by the court that the selection of a known material based on its suitability for its intended use is *prima facie* obvious. *Sinclair & Carroll Co. v. Interchemical Corp.*, 325 U.S. 327, 65 USPQ 297 (1945). See MPEP 2144.07.

## **(10) Response to Argument**

*Applicant argues that Fujita fails to teach or suggest claim element 3). Pg 8 of Appeal Brief.*

The Examiner notes that Kawakami already discloses that the capacity of the cathode is larger than the capacity of the anode (29:52-55). See rejection above.

*Applicant argues that Kawakami fails to describe why it uses a cathode capacity that is larger than its anode capacity. Pg 8 of Appeal Brief.*

It is unclear to the Examiner as to why Kawakami needs to describe why it uses a cathode capacity that is larger than its anode capacity.

*Applicant argues that Fujita fails to provide any suggestion on why its device, which has an anode capacity that is based in part on deposition and dissolution and in part on insertion and extraction, should be combined with Kawakami's device, which has an anode capacity that is based exclusively on insertion and extraction, to provide the beneficial result achieved by Appellant's claimed invention. Pg 8 of Appeal Brief.*

It is unclear to the Examiner as to why the combination cannot be made. The argument above is only a statement with no support or reasons as to why the combination would not be proper. The Examiner notes that modifying Kawakami's anode capacity based on exclusively insertion and extraction with Fujita's teaching on an anode capacity based on deposition and dissolution and in part on insertion and



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extraction would improve the battery by achieving a high energy density and excellent cycle characteristic. See rejection above.

**(11) Related Proceeding(s) Appendix**

No decision rendered by a court or the Board is identified by the examiner in the Related Appeals and Interferences section of this examiner's answer.

For the above reasons, it is believed that the rejections should be sustained.

Respectfully submitted,

/Cynthia Lee/

Examiner, Art Unit 1795

Conferees:

/PATRICK RYAN/

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Quality Assurance Specialist, TC 1700